

GESELL TESTS ON AFRICAN CHILDREN

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IT IS OUR PURPOSE to describe the results of the examination by Gesell tests of 183 African children between 1 and 72 months of age, seen in Kampala or in the country districts around. The work has not been continuous, but has been carried out during three separate visits by one of us (M.G.), each from July to September, in 1954, 1955 and 1956. In 1954, a study was made of the psychologic changes accompanying kwashiorkor in children admitted for treatment to the hospital wards of the Infantile Malnutrition Group. The disease is most prevalent in Uganda during the second year of life, probably because the diet given at weaning is inadequate, and a control group of well-nourished children of the same age was examined at the same time as the children in hospital. It was found that most of the healthy children were precocious in their psychomotor development, and that the precocity was greater the younger the child, but that towards the end of the second year it tended to diminish. Younger and older children were therefore tested, and it is now possible to present results for 183 children, of all the ages covered by the development schedule of Gesell: that is, of all ages from 1 month to 6 years. The results are supplemented by an account of findings on 113 newborn children, who were examined by the method described by André Thomas.¹

CHILDREN STUDIED

The children were obtained in various ways. One group was seen in the building of the Infantile Malnutrition Group, at Mulago Hospital, Kampala, the largest general hospital of the Medical Department of the Uganda Government: They numbered 43, and had been brought to hospital for the treatment of some

minor and unimportant illness, or merely to accompany other members of their families. Another 15 children were examined at the Group's Child Welfare Clinic, in a country district about 16 miles from Kampala, and 12 more at a Child Welfare Clinic in the labor lines of a large agricultural estate, also in a country district, and about 20 miles from the town. Forty-five were seen in their own homes in villages a few miles outside the town, and 68 in a kindergarten at a Theological College, 13 miles from Kampala, where their fathers were training for ordination.

The advantages of a longitudinal study were realized, but for various reasons such a study could not be carried out fully, but 51 children were seen twice in successive years, and 5 were seen three times. Nearly all were children of the theological students or were those who had been seen in their village homes.

The amount of contact with Europeans, the educational level, the social status and the economic circumstances of the families varied considerably, and most classes were represented except the highly educated—none of the parents had been students at Makerere, the University College of East Africa, or at any other University—and the most wealthy. The agricultural laborers, most of whom belonged to the Wakiga tribe of south-western Uganda, had the least knowledge of Europeans and their ways, and were the poorest. The families whose children came to hospital, those seen at the Group's Welfare Clinic, and those seen in their own village homes, were nearly all of the Ganda tribe, which inhabits the district around Kampala, and were mostly small holders who could afford more than the bare necessities of life, and were in fairly comfortable circumstances. The villagers were selected originally by their local chief to take part in a socio-anthropologic investigation to which the Gesell tests were added. They were selected because the chief believed that they would collaborate well, and they were probably above the other Ganda in general intelligence; most of the fathers had well-paid work in Kampala, and

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some only returned to their homes at week ends. The theological students had probably had the best schooling of all the fathers, although their wives were mostly less well educated; they had little money, but were well housed by the Theological College, had adequate cheap food, lived as a community and were well accustomed to Europeans. Nearly all were of tribes other than the Ganda.

None of the children examined was suffering, so far as could be ascertained, from any illness likely to affect his performance in the test. If a child due for a test was found to be unwell, the test was postponed until he was better.

CONDUCT OF THE TESTS

The Gesell technique as used in Paris³ was used without any important modification, except that the child, his mother and the examiner all sat on the floor. Forty of the examinations, and those all of children more than 2 years of age, were carried out by an African assistant who had watched many tests, had been carefully instructed, and had an excellent understanding of the principles involved. The 40 examinations were, however, done under the observation of one of us (M.G.) who herself carried out all the rest completely. The mothers attended all the tests except those on the kindergarten children, for which the teacher was present.

The conditions for the test were best in the hospital where a room in the Group's building could be kept free from disturbance, and in the village homes, where peaceful rooms could usually be found, although in some of them visitors were likely to appear and to interrupt the proceedings with the interminable greetings that are essential for politeness, and by laughing at the children. They were worst at the agricultural estate, because it was impossible to prevent spectators crowding the windows of the clinic room and making continuous comment. They were fairly good at the Theological College, where a large hall was used, but as the hall had open sides the children were distracted occasionally by passers-by.

The test was always preceded by the exchange of a few words with the mother and child, to put them at ease. The child usually sat between the mother and the examiner. The examiner was a little way behind the child, in which position he could make use of her, or not, as he desired. The same order of examina-

tion was always followed. For children under 6 months the order was: rattle, ring, cubes, cup, bottle and tablets, bell, ball, mirror and tests of motor activity. For older children it was: cubes, cup, bottle and tablets, form board, book, pencil, questions, ball, steps and mirror. A few minutes were allowed if necessary at the beginning for the child to make himself familiar with the material, and if he did not perform a test spontaneously, he was encouraged verbally, and sometimes by example. The test usually took between 45 and 60 minutes. It was completed by questioning the mother about the previous history of the child, about his present behaviour and about his environment, and also about the other children in the family. It was preferable to do the questioning after the test, and not before, because the child was not then kept waiting, and the mother was to some extent prepared. Nearly always, the questioning had to be done through an interpreter.

Over a hundred of the tests were photographed with a high-speed flashlight which never caused any discernible upset to the child. For many of the tests, the number of photographs was large enough to record the whole sequence. The photographs could sometimes be used to confirm the written description of the tests, and at all times made a permanent and unequivocal record.

RESULTS

The analysis of the results was qualitative as much as quantitative; the behaviour of the child, the way he set about the tests, and his ability to make contact with the examiner, were all considered as carefully as the failures or successes in performance.

From the first, the precocity of psychomotor development was obvious and striking. It was found in all the group of children, and whatever the conditions of the examination. Most of the children accepted the test situation immediately, were interested in the material, and passed easily from one performance to another, but did not object when the material was changed, or when it was finally put away. Their attitude was all the more remarkable because most of them could never have previously handled anything like the material. A few of the older children, especially some about 4

years of age, turned to the examiner as though asking for approval before taking the first objects. A word of assurance was all that was needed for the child to start the test, and after that the sequence was uninterrupted. The results have been set out by age, in divisions corresponding more or less to the ordinarily-accepted "milestones" of development: For instance, the first ending at 6 months when standing began, and the next at 12 months to correspond with walking. For each age, motor activity (bodily movement, locomotion and prehension), intellectual development (with special reference to *adaptivity*, the term used for a combination of motor and sensory development, ability to concentrate, to observe, to imitate, to remember, and to make a synthesis of experience) and affective development (the relation of the child to his parents, to other people and to his surrounding) have been described.

Children 1 to 6 Months of Age

There was remarkable precocity of motor development. From the first month, when the child was put on his back, he held his head in the mid-line. When he was drawn up by his hands into a sitting position, there was no "head-lag," and when he was held sitting, his back was straight and his head was stable. At 3 months in some children, but in more at 4 months, sitting unsupported for a few seconds was possible. At 5 months the sitting position was fully achieved: The children could remain sitting for half an hour or more, could lean forwards at will and sit up again. The children liked to be stood up, and very early, sometimes in the first month when they were drawn into the sitting position they went further and became erect and could remain momentarily standing, raising and putting down one foot. From 2 months they could support, when standing, the greater part of their weight; at 4 months they could stand if they were held by their two hands, and a few of them if they were held by only one hand. At 6 months they could stand by themselves against a support. Standing

was tested in this way: They were shown the ball, and it was put into the Gesell box; they would then try to raise themselves, sometimes looking for help, sometimes alone, and would finally reach a standing position holding on to the box. Sometimes they held on by only one hand whilst they used the other to point at the ball.

Prehension could be tested even in the first month, because the hands were already half-open and the eyes followed movements closely. The various stages of prehension—cubito-palmary, palmary and radio-palmary—which could be very well studied with the cubes, were passed through rapidly. The children were very interested in the test material, and always tried to pick it up.

At 5 to 6 months they could pick up an object between the thumb and the other fingers held together, and with the thumb opposed to the fingers and not beside them, and they could let go at will. From the age of 3 months, they took a lively interest in everything around and this, and their motor ability, and their pleasure in making contact with the examiner, allowed the usual performance of many tests that European children of the same age could not accomplish.

Thirty-three children were examined, and the Gesell quotients were as follows: (For those unfamiliar with the Gesell scores, it may be helpful to add that 100 represents the average performance of an American or European child at the age in question.)

Motor activity: usual score about 140, none under 100, the range 106-345

Manual ability: usual score about 130, one under 100, the rest 109-360

Adaptivity: usual score about 120, one under 100, the rest 104-275

Language: usual score about 120, one under 100, the rest 100-300

Personal-social behaviour: usual score about 120, three under 100, the rest 100-250

Quotient for general development: usual score about 130, none under 100, the rest 110-260

The younger children—those up to 16 weeks of age—had high quotients for motor development and somewhat lower quotients for adaptivity. The older children—those who were 17 to 26 weeks of age—had quotients for motor development that were slightly lower, but were still high, and their quotients for adaptivity were raised to be equally high. The equality gave the test homogeneity. In the group as a whole, interest was especially great in the examiner and in the mirror, and after them in the bell.

Children 7 to 12 Months of Age

At 7 months the children could stand without support, at 8 months they began to walk, holding on to the wall, and at 9 months they took their first steps alone. At 10 months they could walk well, but with a certain stiffness, and at 1 year they could run. Manual dexterity continued to develop and at 10 months they could take a tablet between the thumb and index finger. At 12 months they could take objects perfectly between the pulps of these digits, whilst the others were held separate and step-wise. The economy of movement was especially notable, as well as this extreme precision. The harmonious development that was first recognized between 3 and 6 months lent homogeneity to the test, and the motor development was paralleled by adaptivity, language and personal-social behaviour. In 34 children who were examined the quotients were consistently high.

Motor activity: usual score about 135, one under 100, the rest 100-150

Manual ability: usual score about 125, two under 100, the rest 106-165

Adaptivity: usual score about 125, two under 100, the rest 100-160

Language: usual score about 120, five under 100, the rest 100-150

Personal-social behaviour: usual score about 120, one under 100, the rest 100-148

Quotient for general development: usual score about 130, two under 100, the rest 102-145

It was particularly the cubes that pleased the children and they liked to exchange them with the examiner.

Children 1 to 2 Years of Age

At this age the precocity tended to be lost and a certain stagnation began to appear. The rate of development slowed down, so that only about 9 months' progress, by European standards, was made in the year. The slight progress made in language was especially notable. On the other hand, the average child was starting to eat alone, was dry and clean, and was already beginning to imitate his mother. He was however very dependent on her, and it was obvious during the test that his need of her was greater than the need of a younger child would have been. He established contact with the examiner less rapidly, and tended to give objects more to his mother than to the examiner. He was particularly interested in the tablet and the bottle, and liked to go on repeatedly putting the tablets in and out. Another great attraction was the book, and he liked to caress the pictures. The quotients, although falling, were still mostly above the average for European children. Fifty children were tested.

Motor activity: usual score about 110, 9 under 100, the rest 100-150

Manual ability: usual score about 110, 5 under 100, the rest 100-150

Adaptivity: usual score about 105, 7 under 100, the rest 100-148

Language: usual score about 100, 24 under 100, the rest 100-125

Personal-social behaviour: usual score about 110, 9 under 100, the rest 100-138

Quotient for general development: usual score about 110, 10 under 100, the rest 100-132

Children 2 to 3 Years of Age

In this age group, it was necessary to consider separately, for many purposes, the kindergarten children and the rest.

Motor ability was fully developed. At 2 years, not only could the child run well, but he could go up and down the steps alone

and with one foot on each step, and could jump from the last. He could also stand momentarily on one foot. Manual dexterity was surprising and prehension was rapid and sure, so that all the 10 tablets could be put into the bottle in less than 20 seconds—an accomplishment of the European child at 4 years. Even in these motor tests, however, there was a difference between the kindergarten children and the others. The kindergarten children quickly grasped what was wanted of them, but the others were much less understanding. For instance, before they would stand on one foot, a number of demonstrations was usually necessary. They found the tablets and the bottle very attractive, however, and when asked to put the tablets into the bottle as quickly as possible, they did so eagerly. There was little noticeable difference in the use of right and left hands. Some of the children took 15, 17 and 20 seconds to put in all the tablets with the right hand, and 17, 20 and 24 seconds when they used the left. About one-third of the children were left-handed.

The children who were not in the kindergarten were very dependent on their mothers and turned to them during the tests for encouragement or approval. Their interest in the material was less, and less well-sustained, than that of the kindergarten children, who succeeded better in the tests that showed adaptivity, and whose tests as a whole were more dynamic and quicker finished.

In one respect, there was no difference between the two groups: There was general acceleration in the development of language, more in comprehension than in expression.

As at the previous age, performances of the various components of the test were very even.

There were 36 children of this age.

Motor activity: usual score about 120, 9 under 100, the rest 100-137

Manual ability: usual score about 110, 9 under 100, the rest 100-131

Adaptivity: usual score about 100, 15 under 100, the rest 100-125

Language: usual score about 90, 28 under 100, the rest 100-130

Personal-social behaviour: usual score about 110, 9 under 100, the rest 103-159

Quotient for general development: usual score about 105, 9 under 100, the rest 101-135

Children Over 3 Years of Age

The difference between the kindergarten children and the others was more accentuated after 3 years of age. Of the 13 village children, only 3 seemed really to be interested in the test and eager for it, and all 3 were the children of teachers. The seven children seen at the hospital or the clinic all had development below normal for their age, except for the motor tests, and only in expression did they continue the progress that was first shown at about age 2½ years. On the whole these 20 children did not adapt themselves to the turning of the form board, as if their appreciation of shape was defective. They placed the round block time after time in its former position, and tried by various means to force it into place. They were also unable to make steps or a bridge with the cubes. The kindergarten children not only made the steps and the bridge, but had a much greater interest in all the objects, carried out their performances more rapidly, showed better comprehension and were more varied in their expression.

The kindergarten children gave names to the things they drew, and most often spontaneously drew a motor car, which they always began with the wheels. The others did not name their drawings; they scribbled spontaneously and roughly imitated, or copied more or less, what they were shown. In front of the mirror, the kindergarten children recognised themselves at once and at once began to describe what they could see, but the others remained fixed, and usually silent, although some finally managed to name something. The kindergarten children had a more extensive vocabulary, and could name nearly all the animals in the book that was being used (*Père Castor's Farm*) although most of those

animals were different from anything they could have seen. They not only named the goat, which is common in Uganda, but also named animals such as the horse and pig that they could have known only from pictures. They could distinguish between horse and donkey, and between several kinds of bird, and one child even recognised a peacock. The other children had only two names for everything—*goat* for all the four-footed beasts and *chicken* for all the birds.

Thirty-one children were tested.

Motor activity: usual score about 108, 12 under 100, the rest 100-142

Manual ability: usual score about 108, 11 under 100, the rest 100-156

Adaptivity: usual score about 95, 42 under 100, the rest 100-142

Language: usual score about 95, 26 under 100, the rest 100-136

Personal-social behaviour: usual score about 100, 23 under 100, the rest 100-142

Quotient for general development: usual

score about 100, 34 under 100, the rest 100-142

Children Who Were Tested More Than Once

Figure 1 shows the general quotients for development of those children who were tested in 1955 and 1956, and who were under 4½ years of age on the second occasion. It is clear that the repetitions gave results identical with those of the transverse study, and that the rate of falling-off was rapid in the first year, and slower afterwards.

The Figure, because it expresses averages of all the components of the tests, does not show the fall in the language quotients already described that was first noticed between 1 and 2 years, and the subsequent partial recovery of those quotients.

Newborn Children

A series of 113 newborn African children were examined during 1956 at Kampala by

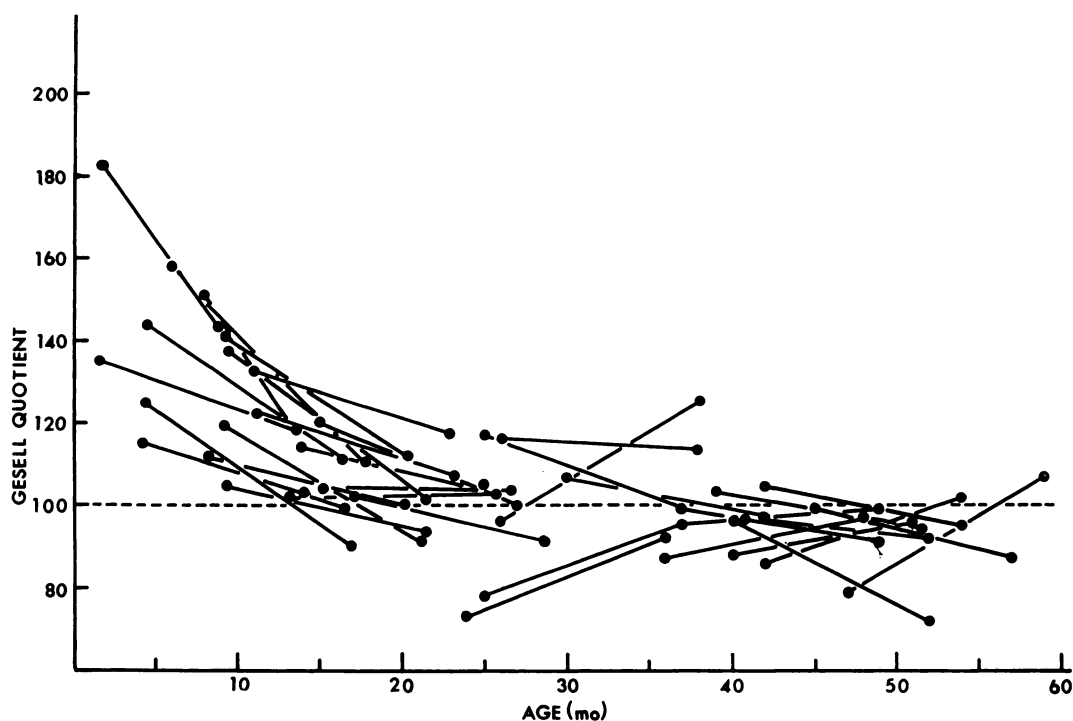


FIG. 1. The Gesell quotients for general development of children who were tested in successive years. The quotients usually fell as age increased.

the method of André Thomas and Saint-Anne Dargassies.¹ Although the method is largely concerned with the determination of the degree of muscular tone and the eliciting of "primitive" reflexes, many of the details are carried over into the Gesell tests for children 4 to 8 weeks of age, or even older. For instance, in both examinations attention is paid to the attitude adopted by the child when he is placed on his back, to the carriage of the head and the straightness of the back when he is drawn into the sitting position, and to the way in which the fingers are held, or resist extension.

The findings on the African children have been described elsewhere.⁶ They can best be summarised by saying that they showed development that is, to say the least, highly unusual in European children at birth or in the first weeks of life, and the African children in fact behaved much like European children 3 to 4 weeks of age. They were not only less hypertonic in their flexion, but had a remarkable control of the head, and many of them could even raise the chin completely free of the table when they were lying on their fronts. Few showed the primitive reflexes after the first day or so of life, even the near-convulsive Moro reflex—usually a very consistent finding in European children—being found in only 6 of the 79 children more than 24 hours of age. The well-known grasp reflex, which enables the European child to suspend himself from a stick in a somewhat simian manner, was feeble and poorly-sustained, and automatic walking was rare. Children only 2 days old were able to follow movement with their eyes, and some appeared to be able to focus.

A study of the African child at birth, more detailed and exact than was possible for this series, would probably show a large number of other points of difference from European children. No explanation was offered for the precocity, but it was fairly clear that it had a genetic basis. There was, unfortunately, no way in which the length of gestation period could be

determined. The dates of the last menstruation were not accurately known.

DISCUSSION

The results of the examination of the newborn children were consistent with the results of the Gesell tests. From birth, the muscular tone of the African infant is different from that of the European, and the head is held better. The lesser degree of flexion may explain why there is in the African earlier standing, prehension and manipulation.

At every stage of development it was necessary to take into account the manner in which the children were reared. Four infants, one aged 3 weeks, twins aged 20 weeks and one aged 27 weeks, were treated in the European manner—that is to say, were fed "by the clock" during the day and not fed at night, were allowed to lie in their cradles almost the whole of the 24 hours and were lifted only for feeding and for toilet purposes. The infant 3 weeks of age, when drawn into the sitting position, could not hold his head up, had a marked kyphosis, and when held horizontally on the examiner's hand, face downwards, could not raise his head. His hands were half-open, this being the only precocity he had in common with the other children of the same age. The twins were girls who had weighed 3.64 and 4.10 kg at birth; their physical appearance was excellent, they had a bright look, and their smile showed the liveliness of their interest, but their development, according to the Gesell standard, was that of infants of only 23 to 24 weeks, giving a general quotient of 118. An infant 19 weeks of age, chosen from the records merely because he was nearest in age, and in no way exceptional among African children, had development corresponding to 36 to 38 weeks, which gave a general quotient of 188. The two infants next in age (21 weeks) had quotients of 171 and 178.

The continual carrying on the back by the mother may strengthen the child's innate ability to hold his head firmly, by forc-

ing him to compensate for her various movements. In the same way, his sitting position on her back, with his back straight, and his legs pressing against her waist, may help him to sit alone earlier than the European child. He is always with his mother when she goes to the fields, or to visit her neighbours, and his life in the changing scene is more stimulating than that of the child who remains in his cradle. The greater stimulation and the constant meetings with other people may account in part for the precocity of his interest in his environment, and his good contact with the examiner. Another asset that may help to make him so lively and interested, and so much at ease with a stranger—nearly all the children smiled at the examiner and caressed her face—is the perpetual comfort in which he lives. He is fed on demand, given the breast at the slightest cry, is always with his mother who is always ready to satisfy his every want, is in intimate contact with her, often with his skin touching hers, and sleeps with her. She introduces him very early to toilet habits, but at first only by holding him out, and she shows no sign of being upset if he fails. There is no forbidding, no refusal, no punishment for the African infant, and when we went into the homes the first thing the mothers did, after the usual formal greetings had ended, was to offer us their babies. It was their usual gesture to all visitors; it was noticed during the examinations that if a visitor were to arrive a baby would always be offered in the same way. The child would remain on the knees of the person to whom he was given, tranquil, at ease and cheerful; from the age of 3 months he would smile at that person and show his pleasure by gurgling and by his lively movements. If finally he began to whimper, the mother took him back immediately and put him to the breast.

The mother begins to offer food besides her breast milk at about the age of 6 months, but continues to give the breast on demand and to sleep with the child. The date for complete weaning is decided arbi-

trarily. The decision made, not only does she stop breast feeding, but she no longer carries him on her back, or sleeps with him, no longer consoles him, but laughs at him if he cries or merely tells him to stop crying. She teaches him to stay quiet, and especially to sit without fidgeting or speaking when a visitor comes. This method of education may explain the remarkably silent behaviour of the older children who happened to be present when the younger ones were being tested. They took part in the test completely passively, watching but making no movement towards the test material and without interfering in any way. When they were tested in their turn, they always sought the approval and permission of the mother.

After the age of 2 years, it is exceptional for the African child to have an adult treat him as though he was of any importance, or play with him. He has lived in a warm friendly world, but now finds himself in the cold. The only thing that his mother asks of him is that he should help her, without thanks if he does what he is told to do, and very often he must fetch and carry for the younger infant who now has the comfort that once was his. Thus, although it is the custom that in the first year the child should be satisfied completely, should be made the center of importance, and should be offered to every visitor, it is exactly the opposite in the second year, in which very little attention is given him, in which answers to his questions will be refused and he will even be forbidden to speak.

Even more, weaning is often reinforced by geographical separation. It is another custom to send the child to a grandmother or an aunt, to honour her, or to get him out of the way. Very often the substitute for the mother does not know the child at all, and lives so far off that the mother cannot come easily or often to visit. The custom has already been described in an account of the psychologic changes accompanying kwashiorkor,⁵ and has been related to the separation of European children.² This year, two of the children exam-

ined last year, when they were both about 15 months old and who had since been separated from their mothers, were examined again. One was living alone with a grandmother, and the other with an aunt who had other young children who were already as much as she could manage. The grandmother and the aunt both told us that all was well, but both had noticed something unusual: The grandmother said that her child had been difficult to feed in the first 3 to 4 months and had slept a great deal in that time, and the aunt said that the other child still very often refused to eat altogether. One of the children, a boy, had been separated for 6 months, and the other, a girl, for 8 months. The boy had slight edema of the dorsum of the feet, and hair that was almost red, but his test showed no difference from that of the year before (the quotients were 104 and 102). The girl was thin, her hair pale, and her look vague; her test was extremely slow, and the quantitative result gave the very low quotient of 72. The year before, when she had been with her mother, the quotient was 109. The result for the boy, showing no fall in the quotient despite the separation, was at first surprising. There was, however, another child left with the mother who had been tested in 1955 and found to have a quotient of 96. He was tested again and his quotient had fallen to 72; he was very inhibited, and was continually being bothered by the mother during the test. It seemed, then, likely that the boy who had been separated had in fact benefited by the separation, and had found, with his grandmother, a more satisfactory relationship than he could achieve with his mother.

Two African women, one a nurse in the Maternity Department of the hospital and the other a deaconess in training who had been a school teacher, told us without being asked that they had noticed how children changed when they were separated. They thought that the custom was applied to 90% of the Ganda children, but to a smaller percentage of children of other tribes. The

fact that the theological students were mostly non-Ganda may have been one of the reasons why there was less falling-off in the quotients of the kindergarten children.

It was obvious to us that in the children over 3 years there was a great difference between those who were given the opportunity to learn, and those who were left to pick up what learning they could. The three children of teachers seen in their homes have already been mentioned. They were considerably in advance of other children of their age, and of the rest of the children it was only those of the theological students who were really at their ease in the tests, were keenly interested in the material, and had a direct contact with the examiner. If the test objects were unfamiliar, they were accustomed to the other material offered in the kindergarten, and were also accustomed to communicate with adults. Some of these children, but none of the rest, when we asked questions to which they did not know how to reply, asked us what we meant.

The kindergarten children had many advantages, but it is doubtful if their parents were of a higher social standing or were more intelligent than the parents of the village children. It seemed that it was not the parents that made the difference, but the way in which the children were reared. There is nothing surprising in the fact that a child asked constantly to exercise his capacities of observation, of imitation, or reasoning and of memory, and who is allowed to ask questions, will have better success in a test of intelligence than a child who has constantly been told to keep quiet. The memories of some of the children of 5 years, who were 4 years of age when they were seen last year, were surprising. They had been asked to make the steps with the cubes—a performance expected at 5 years—and could not do it. This year they made the steps spontaneously, as soon as the cubes were offered. Although most of them gave no explanation, two said they were doing it because we had asked them last year.

For the children from 4 to 6 years the Gesell tests were used although they are less satisfactory for children of that age than for younger ones. We have collected drawings from these older children on which we hope to report at a later date. We have already emphasised the importance of the ears in the drawings of a man and speculated on the relation of the importance to the African way of life, which is founded so largely on oral tradition and communication.⁷

The Applicability of the Gesell Test to the African Infants and Children

The material of the Gesell test was very attractive to the African infant. The tablets and cubes were excellent for the study of manual ability, and the possibility of construction with the cubes, and the form board, were very apt for the exploration of ideas of shape and form. The material also helped in appreciation of the affective structure of the infant, an inhibited one choosing the things that were less brightly coloured and shiny, and a happy one preferring the red cubes and the ball. The mirror, which was used extensively, was of course especially important for children who were unaccustomed to it. Personal-social behaviour could not be adequately explored by the Gesell schedule in its present form. Eating with a spoon, lacing shoes and recognising coins are not the best of tests of a child in Uganda, and some adaptation is called for. The extremely advanced development of motor activity suggested that other modifications might be necessary, for the first year of life, and especially for the first 6 months. A level of development of 12 weeks found for an infant of 4 weeks indicates that the test is not altogether appropriate.

We regard our work as being no more than a preliminary to a complete study, and believe that it should be reported on a much larger number of children, of different tribes in Uganda and of different countries in Africa. The basic finding of precoc-

ity, especially in the younger children, will probably be constant—similar precocity has been observed in Dakar by Faladé⁸—but there will undoubtedly be local variations, some determined genetically and some by environment. The mode of production of the variations will be worth special investigation which will probably require the co-operation of physiologists and social anthropologists, amongst others.

An experimental study of the possibility of preventing the loss of precocity might be the most fascinating of the many lines for future work suggested by these results. Because of its potential value to the African, such a study might also be by far the most important. If it could be undertaken immediately, it might help to ease some of the difficulties that are becoming acute in the present period of rapid transition from illiteracy to higher education. At the moment, in East Africa and in most other parts of the continent, it is only the very exceptional student who is ready for university education at 18 or 19 years, the usual age for entrance to a European university, and anything which could accelerate the earlier training is greatly to be encouraged.

SUMMARY

The results of a series of Gesell tests on African infants and children are presented.

The most remarkable finding was the precocity of the younger infants. The motor development was greatly in advance of that of European infants of the same age, but was not an isolated phenomenon; it was paralleled by advanced adaptivity, language and personal-social behaviour.

The precocity was usually lost in the third year, but was retained by some children who had the advantages of a kindergarten.

The results of the Gesell tests were confirmed by a study of newborn African infants, whose state of development was also precocious by European standards.

The findings are discussed in relation to some details of the African environment, and especially to some local customs which may affect early development. Emphasis is placed on the potential value of finding means by which the early precocity could be maintained.

ACKNOWLEDGMENTS

We wish to thank Mme. J. Aubry for her encouragement in this investigation and for the benefit of her experience of the effects of separation.

The expenses of the investigation were paid from grants made by the International Children's Centre, Paris, and the Mental Health Section of the World Health Organization, Geneva, and we wish to express our thanks especially to Dr. Maurice Gaud, in charge of the African affairs of the Centre, and to Dr. Ronald Hargreaves, formerly Chief of the Section.

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